

SECTION 330520

PIPE REMOVAL AND ABANDONMENT

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. Removal and abandonment of piping and appurtenances, wholly or in part, as required to complete the work as shown on the plans and specified herein.

1.2 SUBMITTALS

- B. The Contractor shall submit the following to the City no less than two (2) weeks prior to commencing pipe removal and abandonment:

1. Flowable Fill: Submit design mix, manufacturers' product data, and compressive strength test results. Results from a minimum of three compressive strength tests shall be provided.
2. Pipe Removal and Abandonment Plan: Prepare a detailed plan including (at a minimum) the following:
 - a. Proposed methods for pipe removal and abandonment;
 - b. Equipment proposed to be used to do the removal and abandonment work;
 - c. Resume of the foreman or subcontractor who will perform pipe filling;
 - d. Projected filling rate, filling pressure, and method of controlling fill pressure for pipe abandonment;
 - e. Proposed locations for caps or plugs, vents, and fill injection;
 - f. Manufacturer's data for caps or plugs (if used)
 - g. Construction details for grout plugs (if used); and
 - h. Location of permitted disposal site to be used for off-site disposal of removed materials.

1.3 SITE CONDITIONS

- A. Prior to commencing field work, a site-specific Maintenance of Traffic (MOT) plan shall be submitted by the Contractor. The MOT plan must be signed/sealed by Florida licensed professional engineer or prepared by someone who possesses FDOT MOT credentials. Submittal of the Maintenance of Traffic plan is in accordance with Section 013000 – Shop Drawings, Submittals, and Samples, and in accordance with FDOT Standards.

- B. Execute pipe removal and abandonment so that interference to vehicular and pedestrian traffic is minimized. Do not place equipment, piping, or any other materials on roadways, driveways, or sidewalks that are to remain in service.

PART 2 - PRODUCTS

2.1 FLOWABLE FILL

- A. Comply with FDOT Standard Specifications for Road and Bridge Construction, Section 121 –Flowable Fill.
- B. Flowable fill shall have a minimum 28-day compressive strength of 75 psi and a maximum 28-day compressive strength of 150 psi. The minimum unit weight shall be 90 lbs/ft³.

2.2 EQUIPMENT FOR FLOWABLE FILL PLACEMENT

- A. Mix flowable fill in automated batch plant and deliver to site in ready-mix trucks. Performance additives may be added at the placement site if required by the mix design.
- B. Use concrete or grout pumps capable of continuous delivery at the planned placement rate.

2.3 GRANULAR FILL MATERIALS

- A. Comply with Section 311030 – Granular Fill Materials.

PART 3 – EXECUTION

3.1 GENERAL

- A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.
- B. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed.
- C. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged.
- D. The Contractor shall repair or replace equipment, piping, wiring, structures, and other improvements damaged or inappropriately

removed at no additional cost to the City.

- E. Do not begin pipe removal and abandonment operations until replacement pipelines have been constructed, tested, certified, and placed into service; all service lines/connections have been installed; and written approval by the City has been provided to proceed with pipe removal and abandonment operations.

3.2 CUTTING AND CAPPING OF PIPELINES

- A. Prior to starting pipe removal or abandonment, the Contractor shall verify that the piping is inactive. If any active service lines/connections are found, notify the City and the Engineer immediately.
- B. Saw cut pipeline and install permanent caps, plugs, or grout plugs on the ends of the pipelines to be abandoned in place. Caps, plugs, and grout plugs shall be watertight and with sufficient strength to support flowable fill until it has cured. Provide bracing or supports as needed.

3.3 ABANDONMENT

- A. The Contractor shall abandon in place all water mains, reclaimed water mains, raw water mains, force mains, gravity sewer mains, service laterals, and service lines that are designated to be abandoned in place.
- B. Pipelines shall be abandoned by pumping a flowable fill mixture into the pipeline such that the pipeline is filled with no voids or air spaces.
- C. The ends of pipelines to be abandoned shall be permanently capped or plugged.
 1. When using a grout plug, place temporary plug or bulkhead approximately 12 inches inside the pipe. Fill the pipe end completely with dry-pack grout mixture.
 2. When using a manufactured plug or cap, install the fitting as recommended by the manufacturer.

D. PREPARATION

1. The City shall be notified at least two (2) business days in advance of flowable fill placement.
2. All force mains, gravity sewer mains, and service laterals that are designated to be abandoned in place shall be flushed prior to placement of flowable fill. Minimum flushing velocity shall be 2.5 feet/second. The Contractor shall be responsible for furnishing all water used for flushing

and collecting and disposing the flush water/wastewater. All work shall comply with FDEP requirements.

3. Remove free water from pipelines prior to fill placement.
4. Pipelines to be abandoned shall be bullheaded at intervals of not more than 500 linear feet. If the line to be abandoned is longer, caps or plugs shall be furnished and installed to maintain the required maximum spacing between caps or plugs.
5. Temporary vents shall be installed in the pipeline to be filled at a maximum spacing of 150 linear feet.

E. EQUIPMENT

1. The materials shall be mixed or delivered in equipment of sufficient size and capacity to provide the desired amount of flowable fill material for each stage in a single operation. The equipment shall be capable of mixing the flowable fill at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions any time during placement of fill.
2. Mixers and Pumps: The flowable fill shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump. Means shall be provided to increase or decrease the water-cement ratio. The system shall mix the flowable fill to a homogeneous consistency. Means of accurately measuring flowable fill component quantities, pumping pressures, and volumes pumped shall be provided.
3. Pressure Gauges: The Contractor shall provide one pressure gauge at the point of injection and one pressure gauge at the grout pump. Placement shall not proceed without appropriate calibrated gauges in place and in working order. Pressure gauges shall be equipped with diaphragm seals, have a working range between 1.5 to 2.0 times the design pressure, and have an accuracy within 0.5 percent of full range. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal to prevent clogging.

F. Flowable Fill Placement

1. Flowable fill placement shall proceed uninterrupted from cap/plug to cap/plug. Placement shall not be terminated until the following conditions have been met:
 - a. The estimated volume of flowable fill has been injected; and
 - b. Flowable fill has been expelled from the furthest vent or cap/plug.

2. Pump flowable fill through caps or plugs designed for placement of two PVC pipes or other suitable construction methods to contain flowable fill in lines to be abandoned. These pipes will act as injection points or vents for placement of flowable fill.
3. Place flowable fill under pressure flow conditions into property vented open system until flowable fill emerges from the vent pipes. Pump flowable fill with sufficient pressure to overcome friction and to fill the pipeline from the downstream end to discharge at the upstream end.
4. Temporary vents, braces/supports, etc., shall not be removed until the flowable fill has adequately cured.

3.4 REMOVAL AND DISPOSAL

- A. The Contractor shall remove and dispose all water mains, reclaimed water mains, raw water mains, force mains, gravity sewer mains, service laterals, and service lines that are designated to be removed.
- B. Pipeline removal shall include all valves, fittings, and appurtenances.
- C. Disposal:
 1. All removed materials shall be disposed of off site.
 2. Removed materials shall not be permitted to accumulate on the project site. At a minimum, removed materials must be removed from the site on a weekly basis.
 3. Disposal shall be in accordance with all applicable city, county, state, and federal regulations.

3.5 BACKFILLING

- A. Backfill excavations, trenches, and pits in accordance with Section 311020 – Trenching, Backfilling, and Compaction.

3.6 ASBESTOS CEMENT PIPE REMOVAL AND DISPOSAL

- A. Comply with Section 311060 – Asbestos Cement Pipe Removal and Disposal.

END OF SECTION